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Fabrication of a Nanoscale Thermal Anemometry Probe Via Electric Field Assisted Assembly JASON KAWASAKI, SEAN BAILEY, LEX SMITS, CRAIG ARNOLD, Princeton University — A nanoscale thermal anemometry probe (NSTAP) is being developed to measure instantaneous fluid velocity at ultra-small scales using conventional constant temperature anemometry principles. The probe consists of a 50 nm by 10 um platinum nanowire (NW) suspended between two current carrying electrodes. Previous nanoscale anemometry wires had been fabricated via metal deposition on a photolithography-patterned substrate; however, deposited NWs are not free-standing and thus must later be lifted off the substrate resulting in low process yields. In this presentation, we discuss alternative methods of shrinking the probes further and increasing the yield of successful probes, including growing nanowires from solution to bridge the electrodes, and using dielectrophoresis to align pregrown nanowires between the electrodes. In each of these methods, the NWs are directly assembled in the desired structure eliminating the need for additional processing steps. NSTAP probes manufactured using these methods will also exhibit higher spatial resolution and temporal response than previous NSTAP designs.

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